

# CAM 2015

*Graduate Student Physics Meeting*  
9 - 12 september 2015, Oaxaca, Oaxaca, México

## Topics:

- Astronomy, Planetary Sciences, Astrophysics and Cosmology • Biophysics and Medical Physics • Computational Physics • Atomic, Molecular and Optical Physics
- Geophysics and Earth Sciences • High Energy, Particles, Fields and Nuclear Physics
- Nanoscience & Nanotechnology • Plasma Physics, Hydrodynamics, Fluids and High-Energy-Density Physics • Quantum Mechanics and Quantum Information
- Statistical Physics and Thermodynamics • Condensed Matter, Solid State Physics, Superconductivity and Materials Sciences

<http://cam2015.smf.mx>



[www.cap.ca](http://www.cap.ca)



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## TECHNICAL SESSIONS

Session I. Particle Physics

Session II. Nanoscience and Nanotechnology

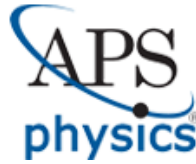
Session III. Statistical Physics and Complex Fluids

Session IV. Applied Physics

Session V. Fundamental Physics Phenomena

Session VI. Astrophysics and Cosmology

Session VII. Multidisciplinary Physics



## MEETING CHAIR WELCOME MESSAGE

Dear CAM-2015 participants,

The International Organizing Committee is pleased to give all of you the welcome to this wonderful city of Oaxaca, México; to enjoy frontier research in Physics as well as the opportunity to share research experiences with your colleagues in México and abroad.

The participation of graduate students from North America has been numerous and beyond expectations. We welcome those who have travelled from Canada, United States of America, and from across México. We are very pleased with this response and we thank you for helping us make a success of this important event for the International Physics community.

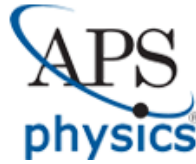
Known hot topics research around the world in Physics are reflected in the Scientific Program of CAM 2015. Particularly hot topics in Fundamental Physics, Astrophysics, Particle Physics, Applied Physics, Statistical Physics, and Nanostructures will be presented as Oral and Poster contributions.

Best of luck to all presenters and participants, and I hope that this conference will increase the scientific collaboration among the young physicists in North America.

Yours Sincerely,

Ricardo Alberto Guirado López

Chair



## **CAM 2015 SPONSORS**

### **Canada**

Canadian Association of Physicists

### **USA**

- American Physical Society Forum of Graduate Students Affairs
- National Science Foundation

### **México**

- Sociedad Mexicana de Física
- Consejo Nacional de Ciencia Y Tecnología



## CONFERENCE ORGANIZERS

### Canada

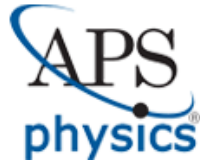
Chris Pugh

### USA

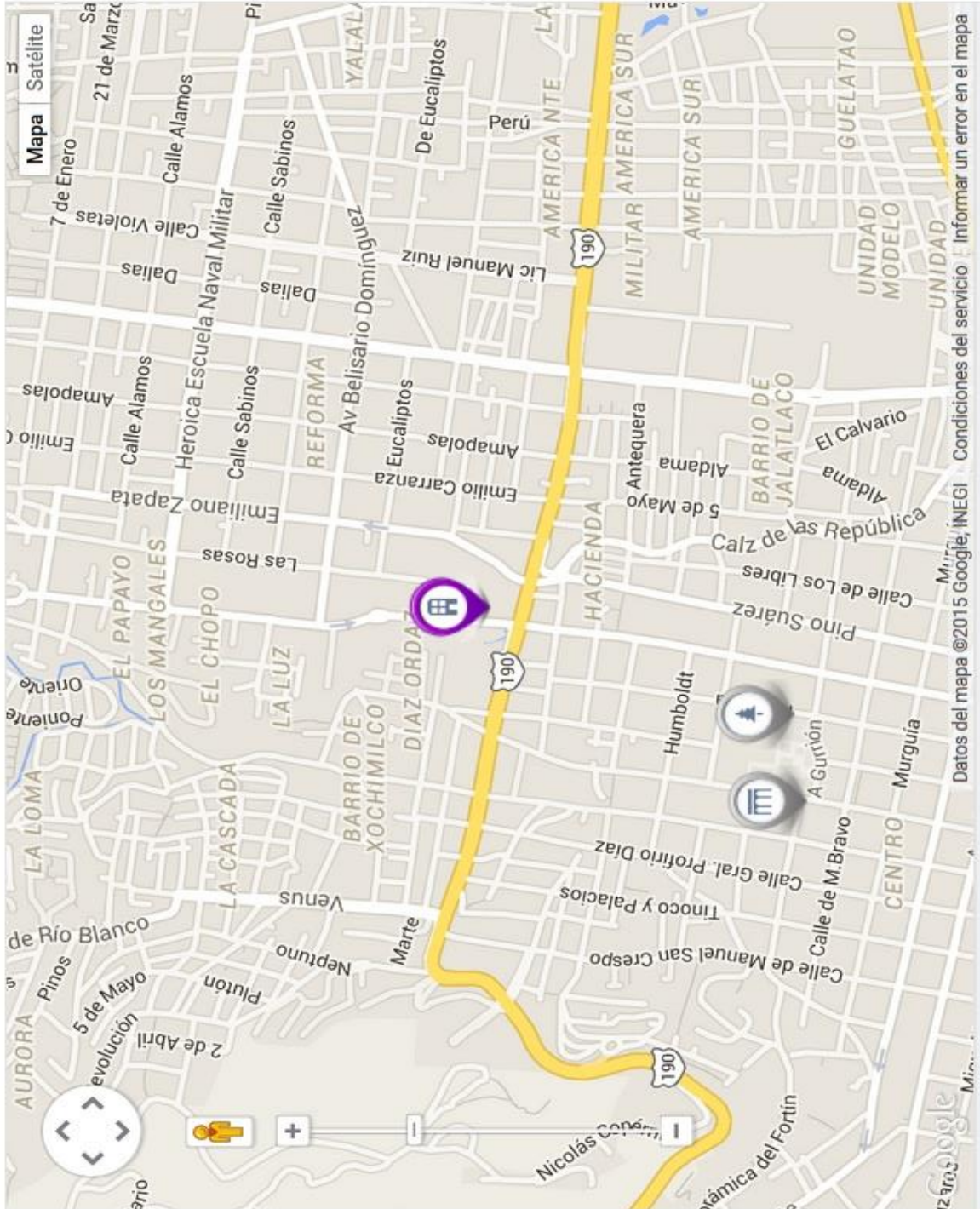
- Valerie Gray (Chair)
- Josh Einstein
- Krista Freeman
- Emmanouli Kargiantoulakis
- Richard Ruiz

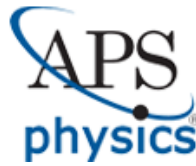
### México

- Susana Lizano Soberón
- Carmen Cisneros
- Ricardo Alberto Guirado López



## Map & Location of Hotel Misión de Los Angeles, Oaxaca





INVITED TALK 1

**Prof. Kristin Poduska**

Memorial University of Newfoundland, CANADA

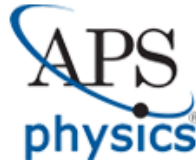
September 10/ 9:00 hrs

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One of the fundamental themes in materials science research is understanding how the way in which a material is synthesized and processed can be used to tune its physical properties (optical, electronic, magnetic, mechanical, and others). Equally important is understanding how the environment in which a material is used can change its performance over time. I will demonstrate that a detailed understanding of a material's structure can provide clues about how it was formed, and can also provide hints about how it might change during future use. To do this, I will focus on two applied examples: the ambient degradation of transparent semiconductors, and the time-dependent changes in archaeological materials.





## INVITED TALK 2

**Prof. A. Encinas-Oropesa**

IPICYT-SLP, MÉXICO

September 10/ 12:10 hrs



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We used a mean field model to explicitly obtain the effective magneto static anisotropy magnetic field in assemblies of exchange decoupled magnetic particles which are contained within an infinite thin film. This model considers the demagnetizing factor of both the individual particles and the outer volume that contains the assembly, and the total anisotropy field is obtained as a function of the center to center distance between particles  $d$ . The two-dimensional array was considered of two different ways: 1) a square lattice of equidistant magnetic particles (first order interaction), and 2) a two-dimensional array of linear chains separated from each other a distance  $d_2$ , which contain magnetic particles separated from each other a distance  $d_1$  (second order interaction). When the interaction is the first order, the dipolar interaction between the particles is ferromagnetic and the effective anisotropy field increases with the dipolar interaction. On the other hand, if the interaction is the second order, additionally appears an antiferromagnetic contribution to the dipolar interaction. Different particular cases were examined for the behavior of the total anisotropy field as a function of  $d_1$  and  $d_2$ , and all showed similar results: when the distance between particles is large the ferromagnetic dipolar interaction is the dominant and the effective anisotropy field increases while the spacing between particles decreases; There is a critical separation for which the total anisotropy field reaches a maximum value, below this separation, the antiferromagnetic dipolar interaction is the dominant and the effective anisotropy field decreases when the particles approach each other.



INVITED TALK 3

**Prof. Emanuela Barzi**

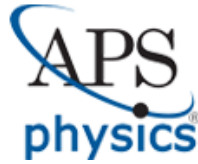
Fermi Lab, USA

September 10/ 15:00 hrs

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The High Field Magnet (HFM) Program at Fermi Lab has been developing Nb<sub>3</sub>Sn high field superconducting magnets, materials and technologies for present and future particle accelerators since the late 90s. Its most important breakthroughs include: the development and demonstration of high-performance Nb<sub>3</sub>Sn strand and cables stable to flux jumps; reliable and reproducible short and long coil fabrication technologies ready for production; accelerator quality mechanical structures; the first world series of Nb<sub>3</sub>Sn dipole and quadrupole models with reproducible magnet parameters; innovative field quality correction techniques, etc. These advances make it possible to consider for the first time 10-12 T Nb<sub>3</sub>Sn magnets in accelerators, specifically for the planned LHC luminosity upgrades. The Program is presently exploring limits of the Nb<sub>3</sub>Sn magnet technology by developing a cost-effective 15 T Nb<sub>3</sub>Sn dipole demonstrator. The ultimate goal is developing magnet technologies based on both High Temperature Superconductors (HTS) and Low Temperature Superconductors (LTS) to achieve fields of 20 T and beyond. This talk summarizes the main results of the Nb<sub>3</sub>Sn accelerator magnet and superconductor R&D at Fermi Lab and discusses the Program next steps and possible applications of its results for the LHC, Muon Collider and FCC.



INVITED TALK 4

**Prof. Susana Lizano**

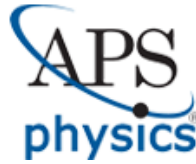
UNAM, MÉXICO

September 10/ 17:10 hrs

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Protoplanetary disks are expected to form as a result of the gravitational collapse of magnetized rotating dense cores. I will discuss recent analytic work and numerical simulations that show that a substantial level of magnetic field diffusion has to occur at high densities in order to form the observed rotationally supported disks. I will also discuss the radial and vertical structure of magnetized accretion disks irradiated by the central star, expected to form in this process. The mass-to-flux ratio is a critical parameter that determines the structure and evolution of these disks. Observations with the powerful radio interferometer Atacama Large Millimeter Array in Chile will be able to establish the value of this ratio in a near future.



INVITED TALK 5

**Prof. Michael Steinitz**

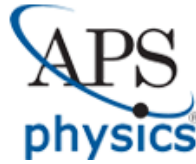
St. Francis Xavier University, CANADA

September 11/ 9:00 hrs

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This brief talk will be a condensed version of a short-course given at UNAM in Mexico City last year. I will discuss what your editor is looking for and what exactly it is that he or she does. This will, of course, deal with scientific content, but also with questions of attribution of textual material used and the avoidance of any possible implications of plagiarism or duplicate publication. It will be emphasized that communication is an essential part of the scientific endeavor. If you cannot communicate what you have done (verbally and in writing) then you haven't done it! Whether we like it or not, English has become the world-wide language of communication and a working knowledge is a great, if not essential, part of your preparation to be a working scientist. If you don't have it, a friend or colleague with good English skills is a very important asset. To write well requires not only language skill, but an understanding of how to write briefly and concisely in a manner that will inform and interest a reader who is not a specialist in your narrow sub-field.



INVITED TALK 6

**Prof. Stefan Westerhoff**

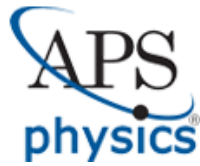
University of Wisconsin-Madison, USA

September 11/ 12:10 hrs

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In March 2015, Mexico and the U.S. inaugurated a new high-energy gamma-ray observatory near Puebla, Mexico: the HAWC (High-Altitude Water Cherenkov) Observatory. Located at 4,100 meters altitude on the slope of the dormant volcano Pico de Orizaba, HAWC is a large field-of-view instrument capable of continuously monitoring the northern sky at energies between roughly 100 GeV and 100 TeV, the highest gamma-ray energies observed so far. Over the next decade, HAWC data will be used to study some of the most violent objects in the known Universe, from supermassive black holes to the remnants of supernova explosions, and provide an unbiased survey of the high-energy sky. Since the Earth's atmosphere is opaque to gamma rays at TeV energies, HAWC is a rather unusual astronomical instrument. It comprises 300 large light-tight water tanks covering an area of 20,000 square meters. Each tank is instrumented with four photomultipliers to detect particles from extensive air showers produced by gamma rays and cosmic rays upon entering the Earth's atmosphere. In this talk, I will present the HAWC science case and the detector principle and discuss first results based on data taken since 2013 with the partially deployed detector.



INVITED TALK 7

**Prof. Allena Opper**

Ohio Univesity, USA

September 11/ 15:00 hrs

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The United States Federal Government provides nearly \$140B to support basic and applied scientific research through a number of agencies. Those agencies have different missions and mechanisms for supporting research and after briefly discussing the US federal funding of scientific research I will focus on the National Science Foundation, which provides about 25% of the federally supported research at US universities and colleges. This talk will discuss how NSF funding leads to both transformational and incremental advances in science by supporting individual investigators, research groups, centers, and facilities. The talk will also review NSF's support of early career scientists.



INVITED TALK 8

**Prof. Pablo Bianucci**

Concordia University, CANADA

September 11/ 17:10 hrs

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Can we make lasers faster and more efficient? Can we explore the interaction between quantum mechanical matter and light? Can we detect the presence of a single virus in a drop of water? Can we play with the propagation speed of light pulses? It turns out that we can do that, and much more, by trapping light very tightly. Thanks to advances in fabrication technology it is now routinely possible to make structures that can keep light confined in microscopic spaces. When this happens, the interactions of light with matter can change in both quantitative and qualitative ways and we can harness these changes to our advantage. The workhorse device for trapping light at such small scales is the optical micro-resonator. I will introduce the working principles of different optical micro-resonators, and some of the cool phenomena that have been demonstrated with them.

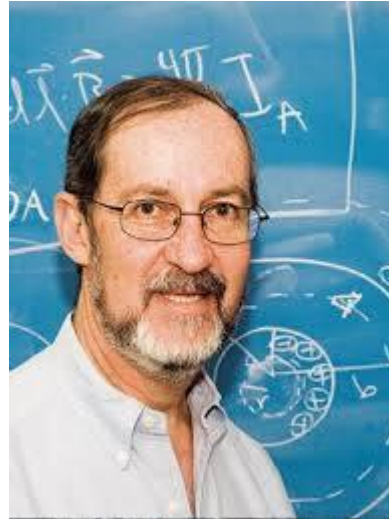


## INVITED TALK 9

**Prof. Luis Mochán**

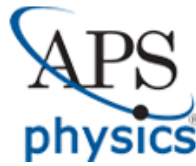
UNAM, MÉXICO

September 12/ 9:00 hrs



Metamaterials are artificial materials made of the alternation of ordinary materials, but with properties that are frequently exotic, not resembling those of neither of its components. When the length scales that characterize a metamaterial are much smaller than the wavelength of an electromagnetic perturbation, its response may be characterized by a macroscopic, homogenized, dielectric function. Even when the length scales are comparable or even larger than the wavelength, a macroscopic response may be appropriate, but only by accounting for spatial as well as temporal dispersion. We develop a formalism for the calculation of the macroscopic response using a computationally efficient recursive procedure that mimics electronic structure calculations and that accounts separately for the microscopic geometry of the system and for its composition. As examples of its use we design metamaterials with extreme linear and circular dichroism. We show how accounting for spatial dispersion allows us to obtain the photonic bands of periodic photonic crystals. Our formalism also allows the calculation of the microscopic field and from it the nonlinear response of the system. Thus we find metamaterials that generate optical second harmonic (SH) although they are made of materials for which SH is symmetry-forbidden.





**CANADIAN-AMERICAN-MEXICAN  
GRADUATE STUDENT PHYSICS CONFERENCE  
9—12 SEPTEMBER 2015, OAXACA, MEXICO**

**GENERAL PROGRAM**

**WED, SEP 9**

**16:00—19:00**      **Registration**

**19:00—20:00**      **Welcome Cocktail**

**THU, SEP 10**

**08:30—09:00**      **Welcoming Ceremony (Plenary Room)**

**09:00—09:50**      **Invited Talk 1 (Plenary Room)**

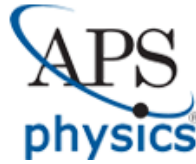
*Tracking the Life Cycle of a Material Through its Structure*

**Prof. Kristin Poduska**, Memorial University of Newfoundland,  
CANADA

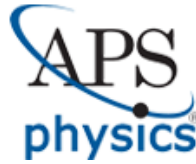
**Chairman:** Prof. A. Encinas-Oropesa (**MÉXICO**)



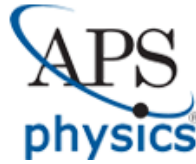
- 10:00—10:45**                    **Simultaneous Sessions I—III**
- I.     **Particle Physics** (*Conference Room 1*)
  - II.    **Nanoscience and Nanotechnology** (*Conference Room 2*)
  - III.   **Statistical Physics and Complex Fluids** (*Conference Room 3*)
- 10:45—11:00**                    **Coffee Break**
- 11:00—12:00**                    **Simultaneous Sessions IV—VI**
- IV.    **Applied Physics** (*Conference Room 1*)
  - V.     **Fundamental Physics Phenomena** (*Conference Room 2*)
  - VI.    **Astrophysics and Cosmology** (*Conference Room 3*)
- 12:10—13:00**                    **Invited Talk 2** (Plenary Room)
- Magnetic Dipolar Interactions: a Tool to Control the Magnetic Properties in Materials Based on Particle Assemblies*
- Prof. A. Encinas-Oropesa**, IPICYT, MÉXICO
- Chairman:** Prof. Michael Steinitz (**CANADA**)
- 13:00—15:00**                    **Lunch Break**
- 15:00—15:50**                    **Invited Talk 3** (Plenary Room)
- 15 Years of R&D on Superconducting Accelerator Magnets at Fermilab*
- Prof. Emanuela Barzi**, Fermi Lab, USA
- Chairwoman:** Prof. Susana Lizano (**MÉXICO**)
- 15:50—16:00**                    **Coffee Break**



- 16:00—17:00**      **Simultaneous Sessions I—III (continued)**
- I.      **Particle Physics** (*Conference Room 1*)
  - II.     **Nanoscience and Nanotechnology** (*Conference Room 2*)
  - III.    **Statistical Physics and Complex Fluids** (*Conference Room 3*)
- 
- 17:10—18:00**      **Invited Talk 4** (Plenary Room)
- Gravitational Collapse of Dense Cores and the Formation of Protoplanetary Disks*
- Prof. Susana Lizano**, UNAM, MÉXICO
- Chairwoman:** Prof. Kristin Poduska (**CANADA**)
- 
- 18:00—19:30**      **Poster Session**
- 
- 20:00—**              **Banquet at the Terrace Hotel and Guelaguetza**
- 
- FRI, SEP 11**
- 
- 09:00—09:50**      **Invited Talk 5** (Plenary Room)
- The Mechanics of Scientific Publishing, Peer Review, and Ethics in Publishing*
- Prof. Michael Steinitz**, St. Francis Xavier University, CANADA
- Chairwoman:** Prof. Carmen Cisneros (**MÉXICO**)
- 
- 10:00—10:45**      **Simultaneous Sessions I—II (continued)**
- I.      **Particle Physics** (*Conference Room 1*)
  - II.     **Nanoscience and Nanotechnology** (*Conference Room 2*)



- 10:45—11:00**      **Coffee Break**
- 11:00—12:00**      **Simultaneous Sessions IV and V (continued)**
- IV.    **Applied Physics** (*Conference Room 1*)
- V.     **Fundamental Physics Phenomena** (*Conference Room 2*)
- 12:10—13:00**      **Invited Talk 6 (Plenary Room)**
- HAWC: A New Gamma-Ray Observatory to Probe Nature's Highest-Energy Accelerators*
- Prof. Stefan Westerhoff**, University of Wisconsin-Madison, USA
- Chairman:** Prof. Luis Mochán (**MÉXICO**)
- 13:00—15:00**      **Lunch Break**
- 15:00—15:50**      **Invited Talk 7 (Plenary Room)**
- United States Federal Governmental Funding for Scientific Research*
- Prof. Allena Opper**, Ohio University, USA
- Chairman:** Prof. Pablo Bianucci (**CANADA**)
- 15:50—16:00**      **Coffee Break**
- 16:00—17:00**      **Simultaneous Sessions IV—V (continued)**
- IV.    **Applied Physics** (*Conference Room 1*)
- V.     **Fundamental Physics Phenomena** (*Conference Room 2*)



**17:10—18:00**

**Invited Talk 8** (Plenary Room)

*Tightly Squeezing Light in Small Spaces*

**Prof. Pablo Bianucci**, Concordia University, CANADA

**Chairman:** Prof. Stefan Westerhoff (USA)

**18:00—18:30**

**Session VII** (*Conference Room 1*)

**VII. Multidisciplinary Physics**

**18:30—19:30**

**Panel Discussion** (Plenary Room)

*Physics Journals: Past, Present, and Future*

- **Prof. Michael Steinitz**, St. Francis Xavier University, CANADA
- **Prof. Francisco Ramos Gómez**, Facultad de Ciencias, UNAM

## **SAT, SEP 12**

**09:00—09:50**

**Invited Talk 9** (Plenary Room)

*Macroscopic Electrodynamics of Nanostructured Metamaterials*

**Prof. Luis Mochán**, UNAM, MÉXICO

**Chairman:** Prof. Francisco Ramos Gómez (MÉXICO)

**10:00—11:15**

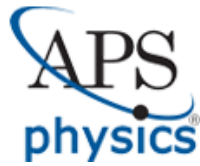
**Simultaneous Sessions I, IV, VI** (continued)

**I. Particle Physics** (*Conference Room 1*)

**IV. Applied Physics** (*Conference Room 2*)

**VI. Astrophysics and Cosmology** (*Conference Room 3*)

**CAM Physics Meeting-2015**

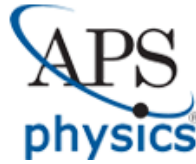


**11:15—11:30      Coffee Break**

**11:30—11:50      Closing Remarks (Plenary Room)**

**SUN, SEP 13**

**10:00—17:00      EXCURSION TO MONTE ALBAN**



**SIMULTANEOUS SESSIONS**

**PROGRAM**

**THU, SEP 10**

**PLENARY ROOM**

**09:00—09:50            Invited Talk 1**

Conference Room 1

**Session I. Particle Physics**

**Chairman:** Luis Salvador Miranda Palacios (MÉXICO)

- |             |     |  |
|-------------|-----|--|
| 10:00—10:15 | I.1 | M. Cervantes ( <b>CANADA</b> ). <i>Ariel Beam Target</i>   |
| 10:15—10:30 | I.2 | Carlos Juárez León ( <b>MÉXICO</b> ). <i>Radiative Corrections to the Dalitz Plots of <math>K^0_{13}</math> Decays</i> |
| 10:30—10:45 | I.3 | Wade S Duvall ( <b>USA</b> ). <i>Beam Normal Single Spin Asymmetries in Electron Scattering From Selected Targets</i>  |

**10:45—11:00            Coffee Break**

**Session IV. Applied Physics**

**Chairman:** Benjamin Rosemeyer (USA)

- |             |      |   |
|-------------|------|---|
| 11:00—11:15 | IV.1 | F.E. Loranca-Ramos ( <b>MÉXICO</b> ). <i>Craters and Granular Jets Generated By Underground Cavity Collapse</i>   |
| 11:15—11:30 | IV.2 | Judith Noemi Rivera ( <b>USA</b> ). <i>Nanoscintillator Fiber-Optic Detector with Integrated Positioning System for Microbeam Radiation Therapy Dosimetry</i> |
| 11:30—11:45 | IV.3 | J.P. Chakrabartty ( <b>CANADA</b> ). <i>Enhanced Photovoltaic Power Conversion Efficiency in Ferroelectric Thin Films</i>                                     |
| 11:45—12:00 | IV.4 | Payam Taheri ( <b>USA</b> ). <i>Growth and Characterization of the Centimeter Scale Monolayer <math>MoS_2</math> for Device Applications</i>                  |

**PLENARY ROOM**

**12:10—13:00            Invited Talk 2**

**13:00—15:00            Lunch Break**



**THU, SEP 10**

**PLENARY ROOM**

**09:00—09:50            Invited Talk 1**

Conference Room 2

**Session II. Nanoscience and Nanotechnology**

**Chairman: G. Vélez (MÉXICO)**

- |             |      |   |
|-------------|------|---|
| 10:00—10:15 | II.1 | Andrew Kozbial ( <b>USA</b> ). <i>Understanding the Intrinsic Water Wettability of Graphite and MoS<sub>2</sub></i> |
| 10:15—10:30 | II.2 | R. Silva-Molina ( <b>MÉXICO</b> ). <i>Hierarchical Formation of Boron Nitride Nanostructures by Ball Milling</i>    |
| 10:30—10:45 | II.3 | Anirban Kundu ( <b>USA</b> ). <i>Chirality of Domain Wall in Ultrathin Ferromagnetic Film</i>                       |

**10:45—11:00            Coffee Break**

**Session V. Fundamental Physics Phenomena**

**Chairman: C. J. Pugh (CANADA)**

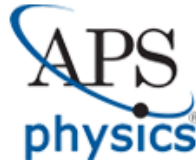
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| 11:00—11:15 | V.1 | R. Ramos ( <b>CANADA</b> ). <i>Tunneling Dynamics of a Bose-Einstein Condensate</i>  |
| 11:15—11:30 | V.2 | Israel Portillo Vázquez ( <b>USA</b> ). <i>BCS—BEC Crossover in a Nambu-Jona-Lasinio Model with Multi-Fermion Interactions</i>                                     |
| 11:30—11:45 | V.3 | L. N. Trujillo ( <b>MÉXICO</b> ). <i>Molecular Electronic Stopping Cross Section within a Harmonic Oscillator and FSGO Approach</i>                                |
| 11:45—12:00 | V.4 | R. Manson ( <b>CANADA</b> ). <i>Population Inversion in Pulse-Driven Semiconductor Quantum Dots due to Phonon Emission: an Open System Quantum Optics Approach</i> |

**PLENARY ROOM**

**12:10—13:00            Invited Talk 2**

**13:00—15:00            Lunch Break**





**THU, SEP 10**

**PLENARY ROOM**

**09:00—09:50            Invited Talk 1**

Conference Room 3

**Session III. Statistical Physics and Complex Fluids**

**Chairman:** Edilio Lázaro Lázaro (MÉXICO)

- |             |       |  |
|-------------|-------|--|
| 10:00—10:15 | III.1 | J. Villanueva-Valencia ( <b>MÉXICO</b> ). <i>Quasi-universal Short-time Dynamics in Quasi-Two-Dimensional Anisotropic Colloidal Mixtures</i> |
| 10:15—10:30 | III.2 | Andrii Bozhko ( <b>USA</b> ). <i>Anomalous Scattering and Redirection of Sound in Narrow Liquid Channels</i>                                 |
| 10:30—10:45 | III.3 | E. Cortes-Morales ( <b>MÉXICO</b> ). <i>Equilibration and Aging of Liquids with Non-spherical Interacting Particles</i>                      |

**10:45—11:00            Coffee Break**

**Session VI. Astrophysics and Cosmology**

**Chairman:** Aníbal Sierra Morales (MÉXICO)

- |             |      |  |
|-------------|------|--|
| 11:00—11:15 | VI.1 | I. Stern ( <b>USA</b> ). <i>The Axion Dark Matter Experiment (ADMX)</i>                                    |
| 11:15—11:30 | VI.2 | D. Rangaswamy ( <b>MÉXICO</b> ). <i>NIR Polarimetry of Molecular Cloud Associated with IRAS 18236—1205</i> |
| 11:30—11:45 | VI.3 | Nesar S. Ramachandra ( <b>USA</b> ). <i>Multi-Stream Portrait of the Cosmic WEB</i>                        |
| 11:45—12:00 | VI.4 | Angélica F. González Fajardo ( <b>MÉXICO</b> ). <i>Galactic Habitable Zone</i>                             |

**PLENARY ROOM**

**12:10—13:00            Invited Talk 2**

**13:00—15:00            Lunch Break**



**THU, SEP 10**

**PLENARY ROOM**

**15:00—15:50            Invited Talk 3**

**15:50—16:00            Coffee Break**

Conference Room 1

**Session I. Particle Physics**

**Chairman:** Joydeep Roy (USA)

16:00—16:15            I.4     Richard Ruiz (**USA**). *QCD Corrections to Heavy Type III Seesaw Leptons*

16:15—16:30            I.5     Luis Salvador Miranda Palacios (**MÉXICO**). *Some Possible Sources of Icecube TEV-PEV Neutrino Events*

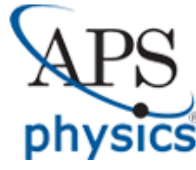
16:30—16:45            I.6     F. Maldonado (**CANADA**). *Ariel. Phase I and Beam Tuning Dump Protection System*

16:45—17:00            I.7     Anna R. Lee (**USA**). *Parity-Violating Asymmetry in the  $n \rightarrow \delta$*

**PLENARY ROOM**

**17:10—18:00            Invited Talk 4**

**18:00—19:30            Poster Session**



**THU, SEP 10**

**PLENARY ROOM**

**15:00—15:50            Invited Talk 3**

**15:50—16:00            Coffee Break**

Conference Room 2

**Session II. Nanoscience and Nanotechnology**

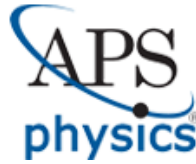
**Chairman:** Ramón Antonio Silva Molina (MÉXICO)

- |             |      |   |
|-------------|------|---|
| 16:00—16:15 | II.4 | Burcu Ozden ( <b>USA</b> ). <i>Qualitative Analysis of Surface Traps in AlGaN/GaN HEMTS Structures Using TRPC Spectroscopy</i>          |
| 16:15—16:30 | II.5 | Miguel Ángel García ( <b>MÉXICO</b> ). <i>Morphology of Ti and Ti-6Al-4V Surfaces with MeV Au Ions</i>                                  |
| 16:30—16:45 | II.6 | Rabi Khanal ( <b>USA</b> ). <i>Composition-Dependent Structural and Transport Properties of Amorphous Transparent Conducting Oxides</i> |
| 16:45—17:00 | II.7 | Rubén Omar Torres Barrera ( <b>MÉXICO</b> ). <i>Biosynthesized Silver Nanoparticles Using Capsicum Genre Fruit Extract</i>              |

**PLENARY ROOM**

**17:10—18:00            Invited Talk 4**

**18:00—19:30            Poster Session**



**THU, SEP 10**

**PLENARY ROOM**

**15:00—15:50            Invited Talk 3**

**15:50—16:00            Coffee Break**

Conference Room 3

**Session III. Statistical Physics and Complex Fluids**

**Chairman:** Andrii Bozhko (USA)

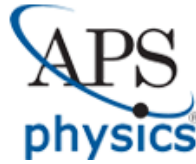
16:00—16:15            III.4    Abhilash Reddy Malipeddi (**USA**). *Effect of a Fluid Filament's Curvature on its Stability*

16:15—16:30            III.5    Edilio Lázaro Lázaro (**MÉXICO**). *Glasses and Gels: Non-equilibrium States in Binary Mixtures*

**PLENARY ROOM**

**17:10—18:00            Invited Talk 4**

**18:00—19:30            Poster Session**



**THU, SEP 10**

**POSTER SESSION**

**18:00—19:30**

- P1.** M.J. Sánchez-González (**MÉXICO**). *Study of the Four Body Region of the Dalitz Plot for Semileptonic Decays of Neutral Kaons*
- P2.** Chinta Mani Aryal (**USA**). *Plasma Wave Instabilities in Non Equilibrium Graphene*
- P3.** Shafat Mubin (**USA**). *Forces and Dynamics in Aromatic Overlayers on Metal Surfaces*
- P4.** Ilse Nava (**USA**). *Microemulsions with Ultra-low IFT Values via Janus Nanoparticles*
- P5.** Saraí Lucía Romo Ávila (**MÉXICO**). *Synthesis and Experimental Characterization of Nitrogen-Doped Carbon Nanotubes Using the CVD Method: Formation of Nanobud-like Configurations*
- P6.** Ivy Krystal Jones (**USA**). *Crystal Growth and Near Infrared Optical Properties of Pr<sup>3+</sup> Doped Lead Halide Materials for Resonantly Pumped Eye Safe Laser Applications*
- P7.** Narayan Sharma (**USA**). *Solution Processable Surface Enhanced Raman Spectroscopy Substrates*
- P8.** Sudip Pandey (**USA**). *Magnetic and Magnetocaloric Properties of Boron Doped Ni-Mn-In Alloys*
- P9.** Katherine Copenhagen (**USA**). *Heterogeneities in Cell Cluster Motion*
- P10.** Yoshua Chávez Bolaños (**MÉXICO**). *Diffusion in Linear Porus Media with Periodic Entropy Barriers: a Tube Formed by Contacting Elipsoids*
- P11.** J. Hernández-Ibarra (**MÉXICO**). *Effective Charges in Concentrated Colloidal Solutions*



**FRI, SEP 11**

**PLENARY ROOM**

**09:00—09:50            Invited Talk 5**

Conference Room 1

**Session I. Particle Physics**

**Chairwoman:** Valerie Gray (USA)

- |             |      |  |
|-------------|------|--|
| 10:00—10:15 | I.8  | Yesica Sonia Flores Meraz ( <b>MÉXICO</b> ). <i>Suppression of <math>f \rightarrow f_1 f_2 f_3</math> Lepton Flavor Violation Processes in Extensions of the Standard Model with Family Symmetry</i> |
| 10:15—10:30 | I.9  | A.D. MacLean ( <b>CANADA</b> ). <i><math>\Upsilon</math>-<math>\Upsilon</math> Angular Correlation Measurements with Griffin</i>   |
| 10:30—10:45 | I.10 | Roman Shapovalov ( <b>USA</b> ). <i>X-Pinch Radiation Performance of a New, 2-LTD-Bricks X-Pinch Driver</i>  |

**10:45—11:00            Coffee Break**

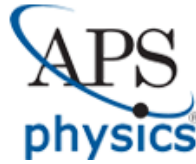
**Session IV. Applied Physics**

**Chairman:** F.E. Loranca-Ramos (MÉXICO)

- |             |      |   |
|-------------|------|---|
| 11:00—11:15 | IV.5 | Benjamin Rosemeyer ( <b>USA</b> ). <i>Magnetic Implications of Non-uniform Superconductivity</i>  |
| 11:15—11:30 | IV.6 | S. Cortes-López ( <b>MÉXICO</b> ). <i>Optical Spectra of a Laminar High-Temperature Superconductor Slab</i>                             |
| 11:30—11:45 | IV.7 | William Mayer ( <b>USA</b> ). <i>Frequency Dispersion of Nonlinear Response Thin Superconducting Films</i>                              |
| 11:45—12:00 | IV.8 | Shrishti Yadav ( <b>USA</b> ). <i>NMR in new BiS<sub>2</sub>-layered superconductor LaO<sub>0.5</sub>F<sub>0.5</sub>BiS<sub>2</sub></i> |

**PLENARY ROOM**

**12:10—13:00            Invited Talk 6**



**FRI, SEP 11**

**PLENARY ROOM**

**09:00—09:50            Invited Talk 5**

Conference Room 2

**Session II. Nanoscience and Nanotechnology**

**Chairman: Andrew Kozbial (USA)**

- |             |       |   |
|-------------|-------|---|
| 10:00—10:15 | II.8  | S. Alagha ( <b>CANADA</b> ). <i>Simulation of Space-Charge-Limited Current in Semiconductor Nanowires</i>   |
| 10:15—10:30 | II.9  | Montserrat Contreras Turrubiarres ( <b>MÉXICO</b> ). <i>Growth and Characterization of TiO<sub>2</sub> Films Grown by Atomic Layer Deposition for Photocatalytic Applications</i> |
| 10:30—10:45 | II.10 | A.Y. Sánchez-Treviño ( <b>MÉXICO</b> ). <i>Trapping DNA Like Network Structures at Low pH</i>   |

**10:45—11:00            Coffee Break**

**Session V. Fundamental Physics Phenomena**

**Chairwoman: L.N. Trujillo (MÉXICO)**

- |             |     |  |
|-------------|-----|--|
| 11:00—11:15 | V.5 | C. J. Pugh ( <b>CANADA</b> ). <i>A Fine Pointing System Suitable for Quantum Communications on a Satellite</i>   |
| 11:15—11:30 | V.6 | José Manuel Méndez Martínez ( <b>MÉXICO</b> ). <i>On the No-Signaling Approach to Quantum Nonlocality</i>  |
| 11:30—11:45 | V.7 | Pardis Niknejadi ( <b>USA</b> ). <i>Radiated Power and Radiation Reaction Forces of Coherently Oscillating Charge Particles in Classical Electrodynamics</i> |
| 11:45—12:00 | V.8 | E. Dupuis ( <b>CANADA</b> ). <i>Tunneling Decay of False Kinks</i>   |

**PLENARY ROOM**

**12:10—13:00            Invited Talk 6**



**FRI, SEP 11**

**PLENARY ROOM**

**15:00—15:50            Invited Talk 7**

**15:50—16:00            Coffee Break**

Conference Room 1

**Session IV. Applied Physics**

**Chairman:** J.P. Chakrabartty (CANADA)

- |             |       |  |
|-------------|-------|--|
| 16:00—16:15 | IV.9  | J. Flores-Marquez ( <b>MÉXICO</b> ). <i>Study of the CdO Influence in the Photovoltaic Efficiency of CdTe Solar Cells</i>                                  |
| 16:15—16:30 | IV.10 | Berna Akgenç ( <b>USA</b> ). <i>Electro-Thermo-Mechanical Properties and Defect Kinetics in <math>A_xA'_{(1-x)}B_yB'_{(1-y)}O_3</math> Ceramics</i>        |
| 16:30—16:45 | IV.11 | N. Santillan ( <b>MÉXICO</b> ). <i>Denaturation of DNA by Dissipation of UV-C Photons: Experiment to Test the Thermodynamic Dissipation Theory of Life</i> |
| 16:45—17:00 | IV.12 | Abhay Singh ( <b>USA</b> ). <i>Template-Assisted Synthesis of InSb Nanowire Arrays in Nanoporous AAO and its Device Implications</i>                       |

**PLENARY ROOM**

**17:10—18:00            Invited Talk 8**

**Session VII. Multidisciplinary Physics**

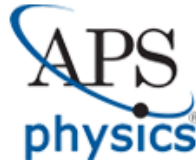
**Chairman:** E. Cortes-Morales (MÉXICO)

- |             |       |   |
|-------------|-------|---|
| 18:00—18:15 | VII.1 | Muhammad Riaz ( <b>USA</b> ). <i>Interactive Simulations in Physics Secondary Education and Student Achievement</i> |
| 18:15—18:30 | VII.2 | Dawn King ( <b>USA</b> ). <i>Evolutionary Dynamics of Population Recovery and Collapse</i>                          |

**PLENARY ROOM**

**18:30—19:30            Panel Discussion**





**FRI, SEP 11**

**PLENARY ROOM**

**15:00—15:50**            **Invited Talk 7**

**15:50—16:00**            **Coffee Break**

Conference Room 2

**Session V. Fundamental Physics Phenomena**

**Chairwoman:** Denhi Martínez (MÉXICO)

16:00—16:15            V.9    G. Torres-Vargas (**MÉXICO**). *Elastic Curves Under Long-Range Forces*

16:15—16:30            V.10   L. Alarie-Vezina (**CANADA**). *Toward a Theory of Symmetric Functions in  $N=2$  Superspace*

16:30—16:45            V.11   Eteri Svanidze (**USA**). *Doping-Induced Quantum Critical Point in Itinerant Antiferromagnet*

16:45—17:00            V.12   Yonglong Xie (**USA**). *Anisotropic Tunneling Between Spin-Polarized Tips and Substrate with Strong Spin-Orbit Coupling*

**PLENARY ROOM**

**17:10—18:00**            **Invited Talk 8**

**PLENARY ROOM**

**18:30—19:30**            **Panel Discussion**



**SAT, SEP 12**

**PLENARY ROOM**

**09:00—09:50            Invited Talk 9**

Conference Room 1

**Session I. Particle Physics**

**Chairman:** Richard Ruiz (USA)

10:00—10:15            I.11    J. Campbell (**CANADA**). *The Coordinate Detector for Jefferson Lab's Super Bigbite Spectrometer Facility*

10:15—10:30            I.12    Valerie Gray (**USA**). *The Qweak Experiment: Search for new Physics at the TEV Scale Via a Measurement of the Proton's Weak Charge*

10:30—10:45            I.13    Joydeep Roy (**USA**). *Imposing LHC Constraints on the Combined Anomaly and Z'-Mediation Mechanism of Supersymmetry Breaking*

10:45—11:00            I.14    Christopher Plumberg (**USA**). *Event-by-Event Fluctuations of HBT Radii and the QGP Shear Viscosity*

**11:15—11:30            Coffee Break**

**PLENARY ROOM**

**11:30—11:50            Concluding Remarks**

**SUN, SEP 13**

**10:00—17:00            EXCURSION TO MONTE ALBAN**



**SAT, SEP 12**

**PLENARY ROOM**

**09:00—09:50            Invited Talk 9**

Conference Room 2

**Session IV. Applied Physics**

**Chairman: Abhay Singh (USA)**

- |             |       |   |
|-------------|-------|---|
| 10:00—10:15 | IV.13 | J. Arriaga-Hernández ( <b>MÉXICO</b> ). <i>Irradiance transport equation Reduced for the Recovery of the Wavefront Applied to Optical Metrology</i> |
| 10:15—10:30 | IV.14 | Jialei Song ( <b>USA</b> ). <i>Analysis of the Aerodynamics of Calliope Hummingbird Forward Flight</i>  |
| 10:30—10:45 | IV.15 | J. Contreras-Vite ( <b>MÉXICO</b> ). <i>A Discrete-State Markov Model for Channel-Protein TMEM16A/AN01</i>  |
| 10:45—11:00 | IV.16 | Tiernan Casey ( <b>USA</b> ). <i>Combustion Enhancement by Non-Thermal Plasma</i>   |
| 11:00—11:15 | IV.17 | Denhi Martinez ( <b>MÉXICO</b> ). <i>Studies by Multiphoton Ionization of Organic Molecules</i>   |

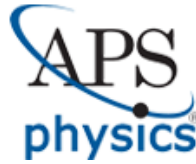
**11:15—11:30            Coffee Break**

**PLENARY ROOM**

**11:30—11:50            Concluding Remarks**

**SUN, SEP 13**

**10:00—17:00            EXCURSION TO MONTE ALBAN**



**SAT, SEP 12**

**PLENARY ROOM**

**09:00—09:50            Invited Talk 9**

Conference Room 3

**Session VI. Astrophysics and Cosmology**

**Chairman:** Nesar S. Ramachandra (USA)

- |             |      |  |
|-------------|------|--|
| 10:00—10:15 | VI.5 | Karl Young ( <b>USA</b> ). <i>Broad-band, Cryogenic, Anti-reflection Coatings for Astrophysical Millimeter Wave Observations</i> |
| 10:15—10:30 | VI.6 | José de Jesús Robles Pérez ( <b>MÉXICO</b> ). <i>Spectral Monitoring of Nova Sagittarii 2015 No. 2</i>                           |
| 10:30—10:45 | VI.7 | Sourabh Nampalliwar ( <b>USA</b> ). <i>Nature of Singularities in Spherical Perfect Fluid Collapse</i>                           |
| 10:45—11:00 | VI.8 | Anibal Sierra Morales ( <b>MÉXICO</b> ). <i>Dust Evolution in Protoplanetary Disks</i>   |

**11:15—11:30            Coffee Break**

**PLENARY ROOM**

**11:30—11:50            Concluding Remarks**

**SUN, SEP 13**

**10:00—17:00            EXCURSION TO MONTE ALBAN**